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|---|---|
| 2611 | |

DATE MAILED: 11/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on <u>15 September 2006</u>.

2a)☒ This action is **FINAL.**    2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) <u>14-22, 25, 28 and 29</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>14-22, 25, and 28-29</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/5/2006 has been entered.

### *Drawings*

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Response to Arguments*

Applicant's arguments filed 9/15/2006 have been fully considered but they are not persuasive.

Applicant's Argument(s):    Regarding claim 25, applicant argues that the claimed invention is not taught or suggested by the instant application's disclosed prior art, and further in view of either Uesugi or Yoshida "a plurality of demodulators that demodulate the signal based on regions of demodulation patterns to which signal points of bits belong using the demodulation patterns different between the error detecting units respectively; and a plurality of detectors that perform error detection on the demodulated signal for each of the error detecting units to obtain reception data."

Examiner's Response:    Regarding the argument of claim 25, Yoshida teaches the limitation that the instant application's disclosed prior art does not teach, wherein a plurality of demodulators that demodulate the signal based on regions of demodulation patterns to which signal points of bits belong using the demodulation patterns different between the error detecting units respectively (Yoshida: Fig. 3, 5, and 9, means 206-209). One of ordinary skill in the art would clearly recognize that error detecting the demodulated signal is well known in the art and it is performed for enhancing error reduction in the communication system as evidenced by the instant application's disclosed prior art (Fig. 1, means 16).

### Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 25 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable

over the instant application's disclosed prior art, and further in view of Yoshida et al (EP

0 944 200).

As to claims 25 and 29, the instant application's disclosed prior art teaches an

adaptive modulation communications system comprising a determiner that determines a

modulation level for modulating transmission data (Fig. 1, means 1-2; page 2, lines 1-3);

an adder that adds an error detecting bit to the transmission data per predetermined

error detecting unit in the transmission data (Fig. 1, means 3; page 2, lines 10-12);

transmitting the modulated data to a receiver (Fig. 1, means 9 and 12); and the

receiving apparatus comprises a receiver that receives the transmission unit (Fig. 1,

means 12); a demodulator that demodulates the received signal, wherein the

demodulator uses demodulation patterns that apply to a modulation scheme of a

modulation level determined by the determiner (Fig. 1, means 14-1 and 14-2; page 3,

lines 14-25; page 4, lines 1-9); and an error detecting unit coupled to the demodulator

(Fig. 1, means 16). The instant application's disclosed prior art does not expressly teach

that a modulator that modulates a transmission data with a number of error detecting

units in accordance with the modulation level by a modulation scheme corresponding to the modulation level so that a bit position is specific to each of the error detecting units; a plurality of demodulators that demodulate the signal based on regions of demodulation patterns to which signal points of bits belong using the demodulation patterns different between the error detecting units respectively. One of ordinary skill in the art would clearly recognize that transmitting a number of error detecting units (i.e. bits) that are sectioned in a predetermined length in accordance with the modulation level and error detecting on the demodulated signal for each of the error detecting units to obtain the transmitted signal is known as Cyclic Redundancy Check (i.e. CRC) coding and is well known in the art and it is performed in order to enhance error reduction and signal estimation in the communications system. Yoshida teaches a plurality of demodulators that demodulate the signal based on regions of demodulation patterns to which signal points of bits belong (Fig. 5, means 206-209; Par. 96). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Yoshida with the instant application's disclosed prior art in order to perform adaptive modulation in a communications system for which any of a modulation level s can possibly be selected is adapted (Par. 93).

Claims 21-22 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the instant application's disclosed prior art.

As to claim 28, the instant application's disclosed prior art teaches an adaptive modulation communications system comprising a determiner that determines a

modulation level for modulating transmission data (Fig. 1, means 1-2; page 2, lines 1-3);

an adder that adds an error detecting bit to the transmission data per predetermined

error detecting unit in the transmission data (Fig. 1, means 3; page 2, lines 10-12);

transmitting the modulated data to a receiver (Fig. 1, means 9 and 12). The instant

application's disclosed prior art does not expressly teach that a modulator that

modulates a transmission data with a number of error detecting units in accordance with

the modulation level by a modulation scheme corresponding to the modulation level so

that a bit position is specific to each of the error detecting units. One of ordinary skill in

the art would clearly recognize that transmitting a number of error detecting units (i.e.

bits) that are sectioned in a predetermined length in accordance with the modulation

level and error detecting on the demodulated signal for each of the error detecting units

to obtain the transmitted signal is known as Cyclic Redundancy Check (i.e. CRC)

coding and is well known in the art and it is performed in order to enhance error

reduction and signal estimation in the communications system. Therefore, it would have

been obvious to one of ordinary skill I the art to transmit a number of error detecting

units that are sectioned in a predetermined length in accordance with the modulation

level for the reason stated above.

As to claim 21, the instant application's disclosed prior art teaches a detector

(Fig. 1, means 16) that performs error detection of a demodulation result in the

demodulator per error detectin unit; and a repeat requester (Fig. 1, repeat request

signal) that sends a repeat request to the transmitting apparatus according to an error

detecting result (Fig. 1, means 16) per error detecting unit (page 3, lines 14-page 4, lines 1-20).

As to claim 22, the instant application's disclosed prior art teaches that the determiner determines the modulation level based on channel quality estimated from the repeat request signal (Fig. 1, means 1-2, 5-6, and 11; page 4, lines 18-page 5, line10).

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the instant application's disclosed prior art and Yoshida, further in view of Sugiyama et al (US 5,862,175).

As to claim 14, the instant application's disclosed prior art teaches that the determiner determines the modulation level (Fig. 1, means 1-2). The instant application's disclosed prior art and Yoshida are silent about the modulation level uses a number having an integer square root. Sugiyama, in the same field of endeavor, teaches a modulation communications system that the modulation scheme is varied among M-ary modulation schemes (n phase shift keying modulation schemes) each with a square root of the number of signal points being an integer (Fig. 1, $2^n$ multi-level modulation means; Col. 3, lines 5-9). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Sugiyama with the instant application's disclosed prior art and Yoshida in which selectable and flexible modulation of variable order can be performed.

As to claim 15, the instant application's disclosed prior art teaches that the determiner determines the modulation level (Fig. 1, means 1-2). The instant application's disclosed prior art and Yoshida are silent about the modulation level uses a number not having an integer square root. Sugiyama, in the same field of endeavor, teaches a modulation communications system that the modulation scheme is varied among M-ary modulation schemes (n phase shift keying modulation schemes) each with a square root of the number of signal points not being an integer (Fig. 1, $2^n$ multi-level modulation means; Col. 3, lines 5-9). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teaching of Sugiyama with the instant application's disclosed prior art and Yoshida in which selectable and flexible modulation of variable order can be performed.

Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the instant application's disclosed prior art and Yoshida, further in view of Lee et al (US 6,259,744).

As to claim 16, the instant application's disclosed prior art further teaches that the transmitting apparatus comprises a modulator (Fig. 1, means 6-1 and 6-2) that modulates the transmission data at a modulation level determined by the determiner (Fig. 1, means 1, 2, 6-1, and 6-2). The instant application's disclosed prior art and Yoshida teach all the subject matter claimed in claim 25, expect for the modulator modulates the transmission data by arranging signal points in such a way that a difference between the number of signal points on the I-axis and Q-axis is small. Lee, in

the same field of endeavor, teaches a signal space diagram wherein the number of

signal points on the I-axis is the same as the number of signal points on the Q-axis (Fig.

3). Therefore, it would have been obvious to one of ordinary skill in the art to combine

the teaching of Lee with the instant application's disclosed prior art and Yoshida in order

to minimize header decoded BER (i.e. bit error rate) over many channel conditions (Col.

2, Lines 17-19).

As to claims 17 and 18, the instant application's disclosed prior art further

teaches that the transmitting apparatus comprises a modulator (Fig. 1, means 6-1 and

6-2) that modulates the transmission data at a modulation level determined by the

determiner (Fig. 1, means 1, 2, 6-1, and 6-2). The instant application's disclosed prior

art and Yoshida teach all the subject matter claimed in claim 25, expect for using a

modulation scheme in which a phase direction is identified by an axis that crosses an

origin point in a signal space diagram. Lee, in the same field of endeavor, teaches using

phase determination axes (Fig. 3, means 54 and 56; Col. 5, Lines 1-12 and 51-53)

passing through the origin point in a signal space diagram and computing the closest

distance between the symbol and the bit on the decision line (i.e. amplitude

identification). Therefore, it would have been obvious to one of ordinary skill in the art to

combine the teaching of Lee with the instant application's disclosed prior art and

Yoshida in order to detect error probability of a bit in a symbol and improving the signal

recovery process (Col. 5, Lines 7 and 8).

As to claim 19, the instant application's disclosed prior art further teaches that the

adder (Fig. 1, means 3) adds the error detecting bit (page 2, lines 10-12); the receiving

apparatus further comprises a detector that performs error detection (Fig. 1, means 16) of each demodulation result (Fig. 1, means 14) in the demodulator using the error detection bit; and the detector outputs a bit without an error as an effective bit transmitted from the transmitting apparatus (Fig. 1, means 16). The instant application's disclosed prior art, Yoshida, and Lee teach all the subject matter claimed in claim 25, expect for the error detection unit performs error detection every plurality of bits collectively. One of ordinary skill in the art would clearly recognize that error detecting bit addition every plurality of bits collectively is well known in the art (Cyclic Redundancy Check or CRC) and it is performed in order to enhance error reduction in the communications system. Therefore, it would have been obvious to one of ordinary skill in the art to employ an error-detecting unit in a receiving device for the reason stated above.

As to claim 20, the instant application's disclosed prior art and Yoshida teach all the subject matter claimed in claim 25, except for the transmitter transmits a pilot signal (training sequence or the second bit decision line) arranged in the middle of a maximum amplitude in a signal space diagram of the modulation scheme. Lee teaches that the pilot signal (Fig. 3, decision lines 54 and 56) is arranged in the middle of a maximum amplitude in a signal space diagram of the modulation scheme (column 5, lines 1-10 and 30-32; column 6, lines 47-50). One of ordinary skill in the art would clearly recognize that transmitting pilot signal from a transmitter to a receiver is well known in the art and it is performed for performance characteristic measurements and synchronization purposes. Therefore, it would have been obvious to one of ordinary skill

in the art to combine the teaching of Lee with the instant application's disclosed prior art

and Yoshida in order to greatly improve the reliability of fields that carry the preferred

information (column 2, lines 58-60).


## *Conclusion*

The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

Toshimitsu (US 6,735,256) see column 4, lines 53-55 for the discussion of

adding error detecting bits to the signal to be transmitted and demodulating and

verifying that whether the received signal is erroneous or not by performing error

detection on the demodulated received signal in the receiver.

This is a continuation of applicant's earlier Application No. 10/069,009. All claims

are drawn to the same invention claimed in the earlier application and could have been

finally rejected on the grounds and art of record in the next Office action if they had

been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL**

even though it is a first action in this case. See MPEP § 706.07(b). Applicant is

reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

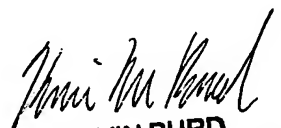shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no, however, event will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

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USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Freshteh Aghdam
October 19, 2006

KEVIN BURD
PRIMARY EXAMINER